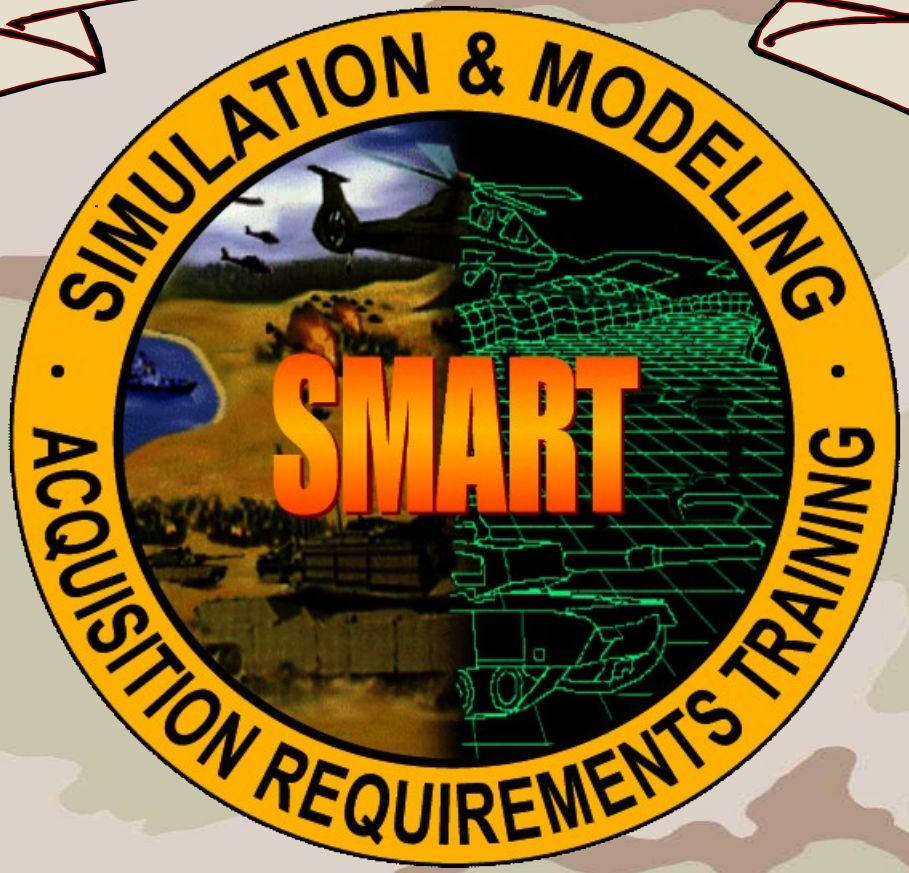
SMART 101


SIMULATION & MODELING
SMART
ACQUISITION REQUIREMENTS TRAINING

SMART 101 Objectives

- Identify the tenets of SMART
- Identify ways that SMART can be used in the Army
- Describe a Simulation Support Plan
- Describe ways that SMART can support a Program Office's objectives

SMART 101 Outline

I. History
II. Guidance and Policy
III. Applications
IV. Sim Support Plans
V. PMO Considerations
VI. Where to get Help

SMART 101 Schedule

- Presentation 0800-0915
- Break 0915-0930
- Presentation 0930-1045
- Break 1045-1100
- Presentation 1100-1200

SMART 101

SMART is an acronym for Simulation and Modeling for Acquisition, Requirements, and Training

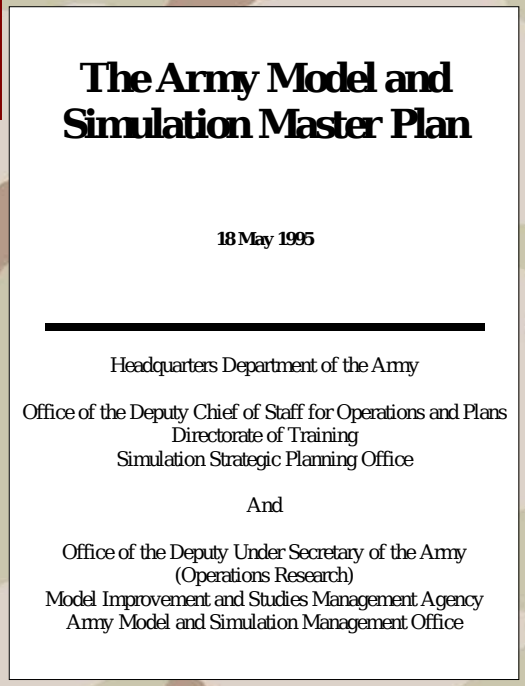
SMART Definition

SMART is a change in Army business practices, through the exploitation of emerging M&S and other information age technologies, to ensure early collaboration and synchronization of effort across the total Army systems life cycle.

- **SMART is a concept**
- **SMART is a change in Army business practices**
- **SMART exploits M&S and related information age technologies**
- **Implementation of SMART involves changes in processes**

SMART History

1995…M&S Domains identified in Army Master Plan



The Army Model and Simulation Master Plan

18 May 1995

Headquarters Department of the Army

Office of the Deputy Chief of Staff for Operations and Plans
Directorate of Training
Simulation Strategic Planning Office

And

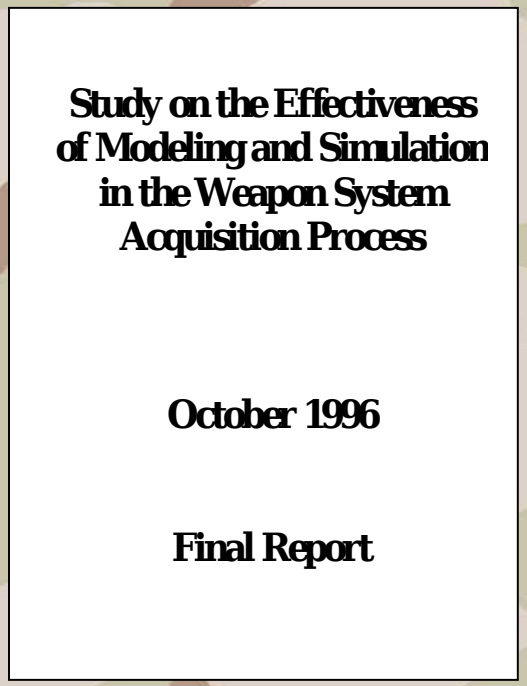
Office of the Deputy Under Secretary of the Army
(Operations Research)
Model Improvement and Studies Management Agency
Army Model and Simulation Management Office

"Army M&S applications address requirements within one or more of three M&S domains…Advanced Concepts and Requirements (ACR)…Research, Development, and Acquisition (RDA)… Training, Exercises, and Military Operations (TEMO)"

The Army Model and Simulation Master Plan, 18 May

SMART History

1996…New OSD Simulation Based Acquisition (SBA) Initiative described



"The use of M&S tools has increased…It is the result of… powerful new emerging M&S tools to support existing processes and to satisfy emerging requirements…it is clear that a revolution is underway and that the end result will be a new way of doing business. We will call this new approach to acquisition, 'Simulation Based Acquisition'…"

Study on the Effectiveness of Modeling and Simulation in the Weapon System Acquisition Process, October 1996

SMART History

1997...New MILDEP briefed on OSD Simulation Based Acquisition (SBA) Initiative

"SBA...this is not about sm business...give me a new name; one that captures the idea of collaboration among the 3 communities"

LTG Paul J. Kern, Military Deputy to the Assistant Secretary of the Army (Acquisition, Logistics and Technology)

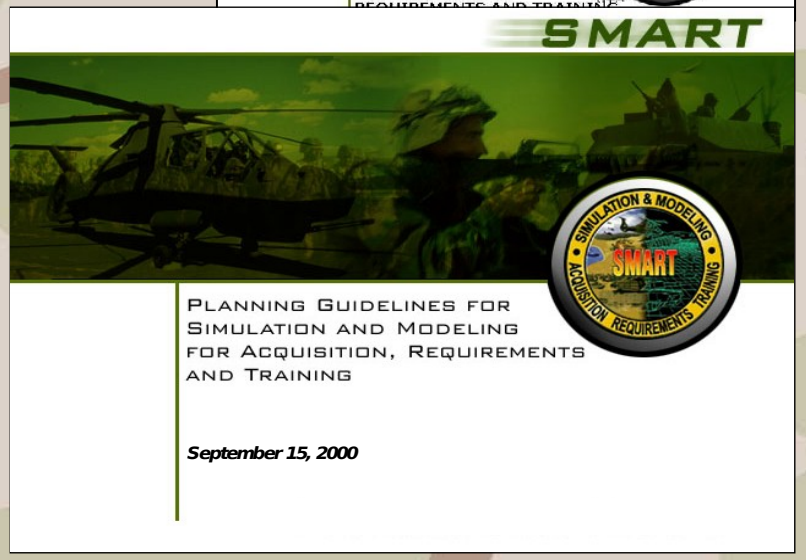
SMART History

***1998*...New name for Army's new initiative: SMART**

"The concept behind SBA is that t
M&S tools can be integrated...thr
out the system lifecycle process...Because SBA implies an interface and sharing of M&S tools and technologies between the RDA M&S Domain and the ACR and TEMO Domains, a new name has been adopted. The new name is Simulation and Modeling for Acquisition, Requirements, and Training (SMART). "

SMART History

2000…SMART Guidance published



"The Planning Guidelines… were developed to address growing robustness of SMART as it became the new paradigm for conducting acquisition and addressing a system's M&S needs throughout the life cycle of the system."

In Executive Summary, Planning Guidelines for Simulation and Modeling for Acquisition, Requirements and Training, September, 2000

SMART Vision

The SMART Vision Statement:

"Be a world leader in Modeling and Simulation to continuously improve Army effectiveness through a disciplined collaborative environment in partnership with industry, government, and academia."

ASAALT memo, Army Vision and Goals for Simulation and Modeling for Acquisition, Requirements and Training, 3 Nov 99

The Strategic Goals of SMART

1. Promote comprehensive modeling and simulation (M&S) policies, disciplined processes, and a high performance workforce to stimulate innovation and agility in developing enhanced Army capability.

ASAALT memo, Army Vision and Goals for Simulation and Modeling for Acquisition, Requirements and Training, 3 Nov 99

The Strategic Goals of SMART

2. Establish a means to continuously and quantitatively measure, in a joint environment, life cycle cost and relevant measures of effectiveness

ASAALT memo, Army Vision and Goals for Simulation and Modeling for Acquisition, Requirements and Training, 3 Nov 99

The Strategic Goals of SMART

3. Create and maintain disciplined collaborative M&S environments for all stakeholders to exchange and reuse data and information to support "SMART" modernization decisions.

ASAALT memo, Army Vision and Goals for Simulation and Modeling for Acquisition, Requirements and Training, 3 Nov 99

The Strategic Goals of SMART

4. Establish habitual associations and incentives to leverage the investments and inventions of academia, industry, and other government partners so that the Army benefits from the synergy of mutual investr

ASAALT memo, Army Vision and Goals for Simulation and Modeling for Acquisition, Requirements and Training, 3 Nov 99

SMART Tenets

Create improved quality, timeliness, and economy (Better, Faster, Cheaper).

Collaborate with all stakeholders using a robust, integrated, disciplined Collaborative Environment (CE) and digital representation.

Capitalize on emerging and state of the art Modeling and Simulation and related technologies to optimize readiness through modernization.

Cultivate a total lifecycle perspective from

Create

Create improved quality, timeliness, and economy (Better, Faster, Cheaper).

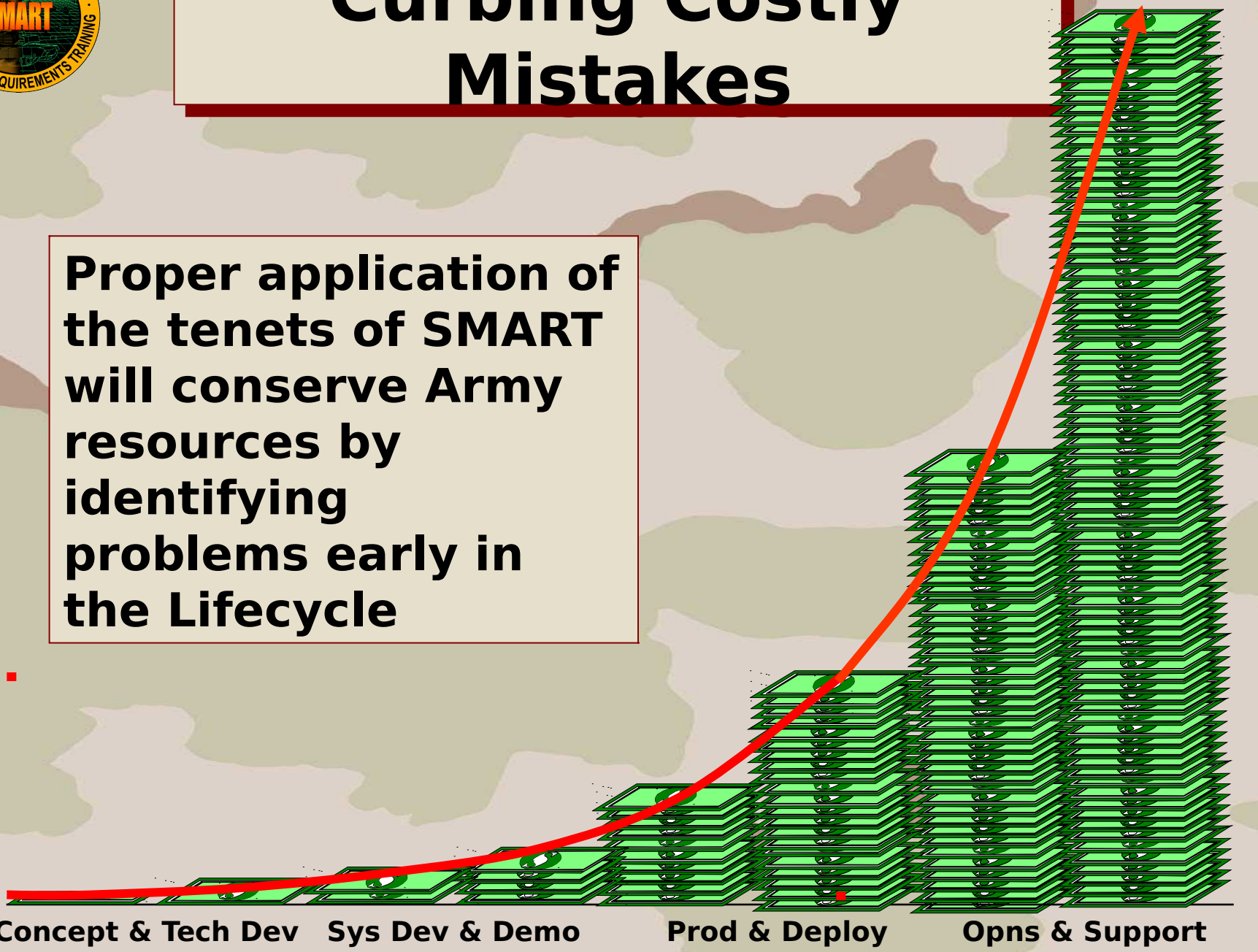
- **Reduced Total Ownership Cost (TOC), Time to Initial Operating Capability (IOC), and Logistics Tail**
- **Increased Supportability, Maintainability, and Military Worth**
- **More Effective, Cost Efficient**

dual, Crew, and System

Better, Faster, Cheape

Curbing Costly Mistakes

Proper application of the tenets of SMART will conserve Army resources by identifying problems early in the Lifecycle



Collaborate

- **Collaboration with:**
  - Contractors
  - Entertainment Industry
  - Government Organizations
  - Academia
- **Collaboration across:**
  - Functional Areas
  - Milestones
  - Programs

Collaborate with all stakeholders using a robust, integrated, disciplined CE and digital representation.

COLLABORATION IS THE HEART OF SMART

How It Used to Be

REQUIREMENTS:
ADVANCED CONCEPTS & REQUIREMENTS (ACR)

ACQUISITION:
RESEARCH, DEVELOPMENT, ACQUISITION (RDA)

TRAINING:
TRAINING, EXERCISES, MILITARY OPS (TEMO)

How It Used to Be

REQUIREME
S:
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SMART

NING,
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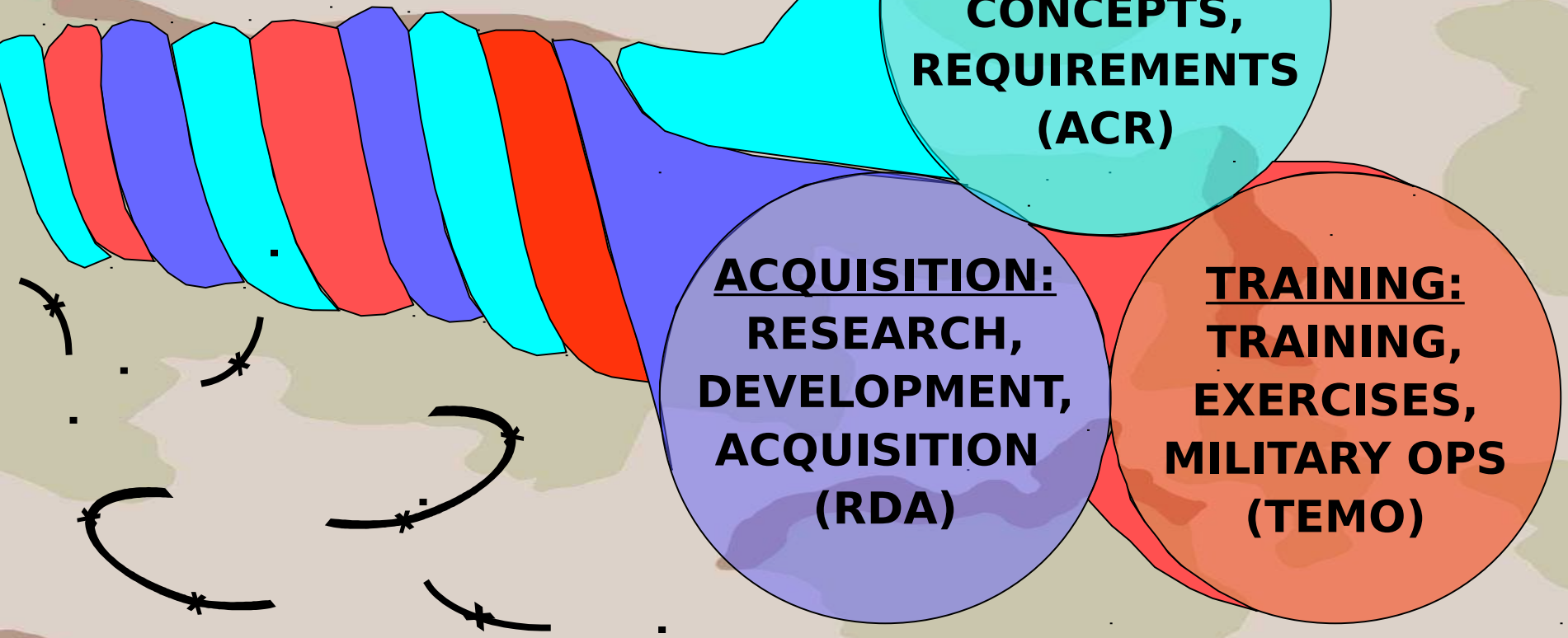
ITARY
(TEMO)

SMART Builds the Team

SMART tears down the fences and builds a cohesive team



Capitalize

Virtual Environments

Virtual Humans

- SMART capitalizes on new technologies, techniques and best practices to provide greater efficiency and capability to continually improve the Force and support Army Transformation.

Computers

M&S

Information Technologies

LASER Technology

Capitalize on emerging and state of art Modeling and Simulation and related technologies to optimize readiness through modernization.

New Technology-Value Added

Comanche Helicopter (RAH 66)

It took 38 Sikorski draftsmen 6 months to develop working drawings for the CH-53E Super Stallion's outside contours. M&S made it possible for 1 engineer working only 1 month to develop the working drawings for the new Comanche.

CH 53

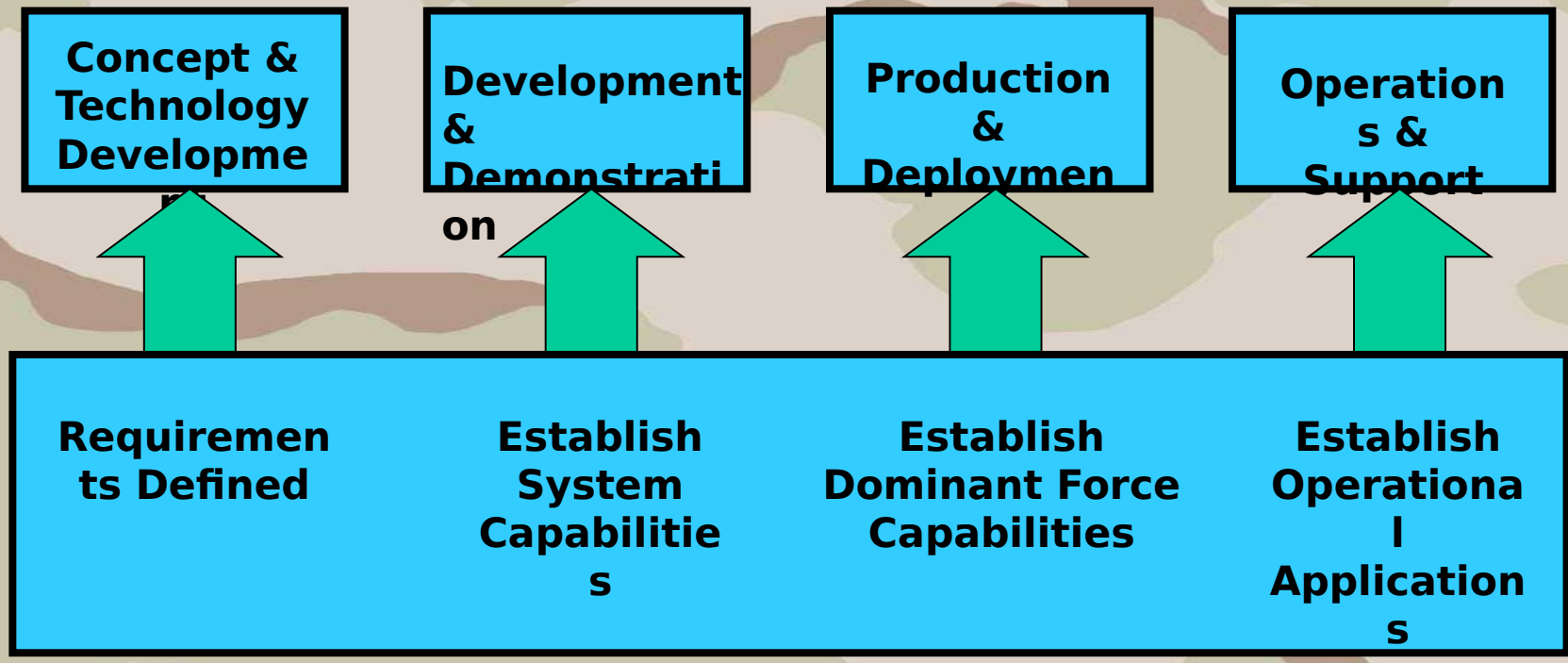
RAH 66

Cultivate

Cultivate a total lifecycle perspective from concept exploration to retirement (lifecycle evolution).

- **SMART permits the application of progressively developed models and simulations to be used, first in concept exploration, through early design and requirements development, and evolved to mature training and sustainment functions and further, to retirement.**

SMART Lifecycle



SMART Full Lifecycle Dominance

Adapted from Joint Pub 3.0 Phases of the Joint Campaign

SMART Principles of War

- **Create**
- **Collaborate**
- **Capitalize**
- **Cultivate**

- **Objective.** A clearly defined, decisive, and attainable objective.
- **Offensive.** To seize, retain, and exploit the initiative.
- **Mass.** To concentrate all available resources at the critical place and time to achieve decisive results.

SMART Principles of War

- **Create**
- **Collaborate**
- **Capitalize**
- **Cultivate**

- **Economy of Force.** To allocate minimum essential resources to secondary efforts.
- **Maneuver.** Positioning of assets to favor mission accomplishment.
- **Unity of Command.** To ensure unity of effort: coordination and cooperation among all elements toward a commonly recognized

SMART Principles of War

- **Create**
- **Collaborate**
- **Capitalize**
- **Cultivate**

- **Security.** To never permit the enemy to acquire unexpected advantage.
- **Surprise.** To strike the enemy at a time or place or in a manner for which it is unprepared.
- **Simplicity.** To prepare clear, uncomplicated plans and concise orders to ensure thorough understanding.

The FM on Operations

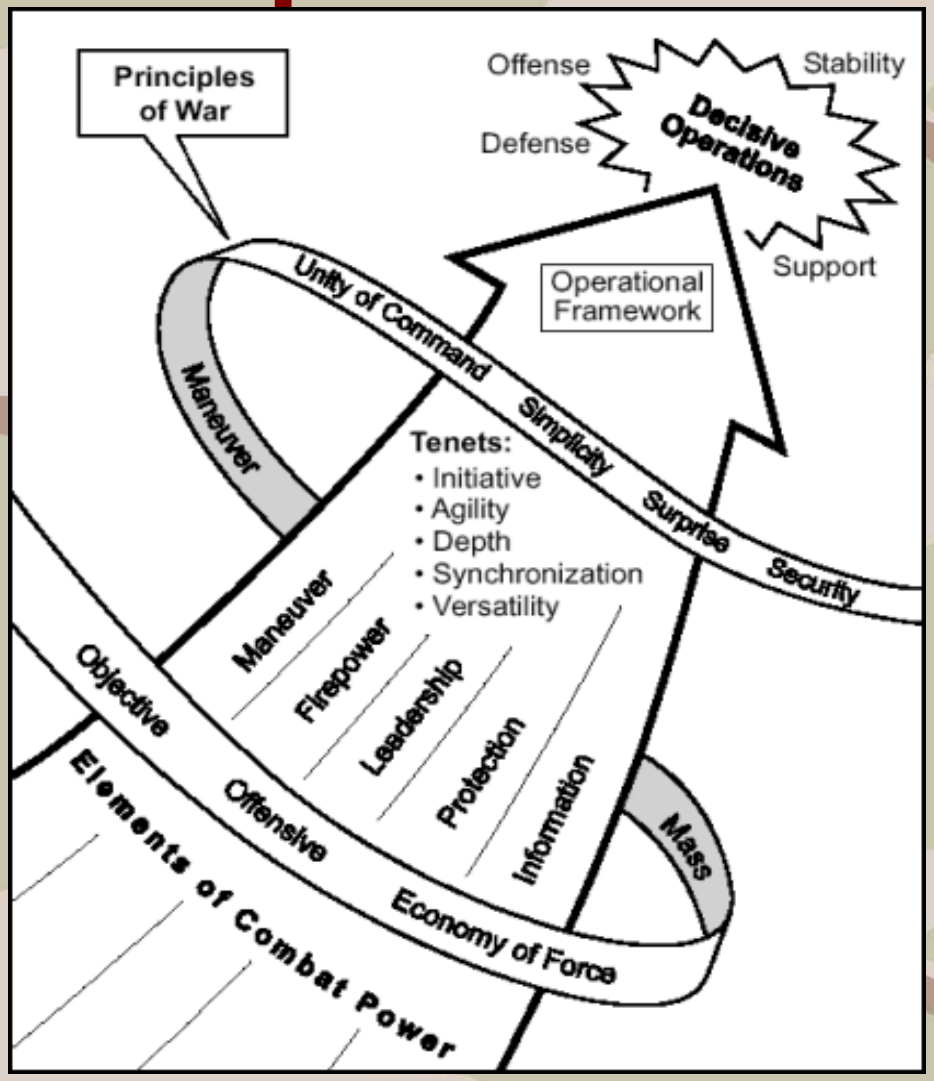
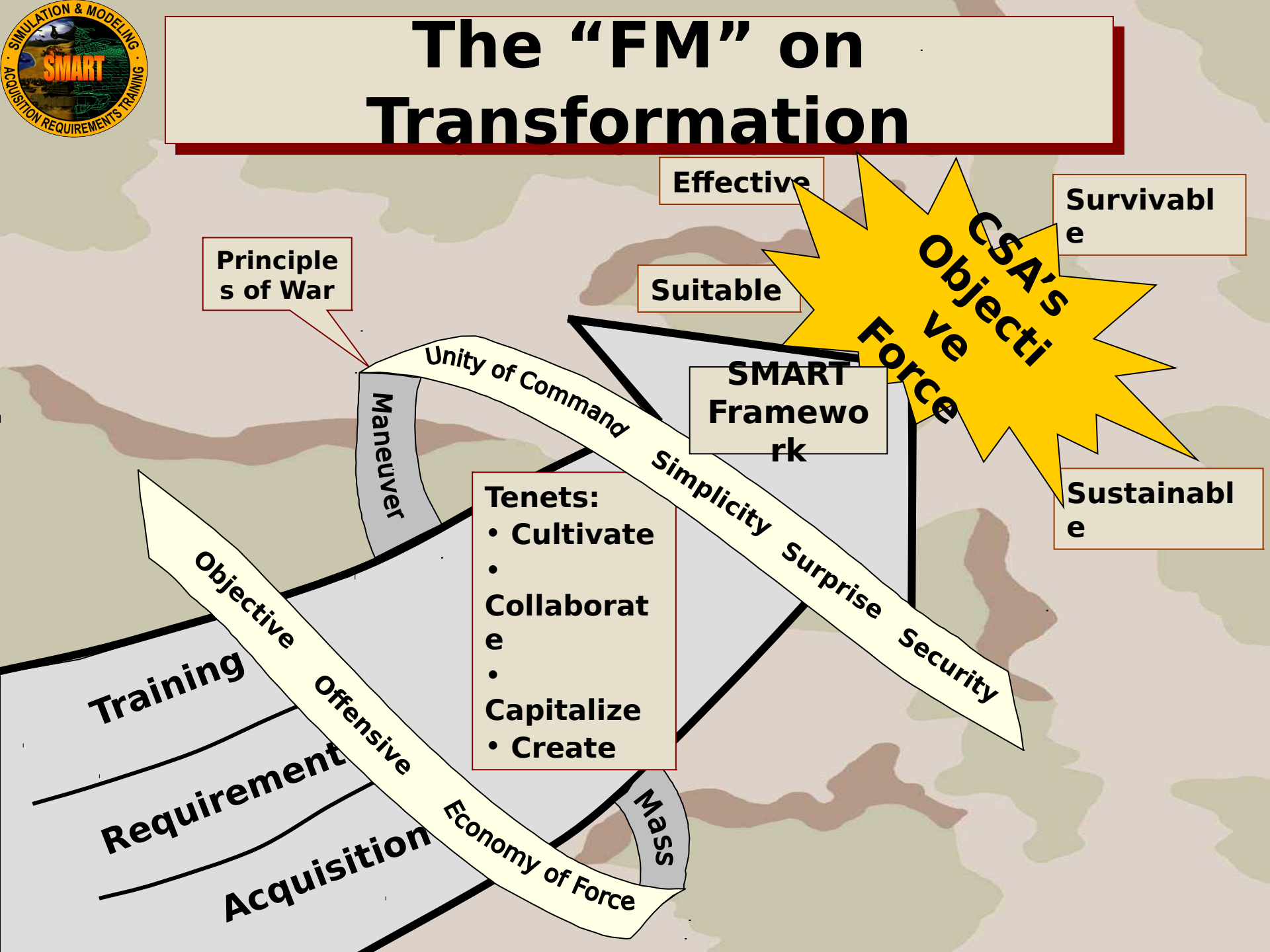


Figure 4-1. The Fundamentals of Full Spectrum Operations

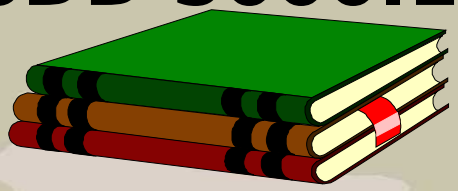
FM 3-0, Operations, 14 June, 2001

The "FM" on Transformation



Army Policy

"...in accordance with Department of Defense Directive (DoDD) 5000.1, and Department of Defense Regulation 5000.2-R. The Army will follow the guidance and procedures contained in DoDD 5000.1 and DoD 5000.2-R..."



Publications
Doctrine
Operations
Tactics

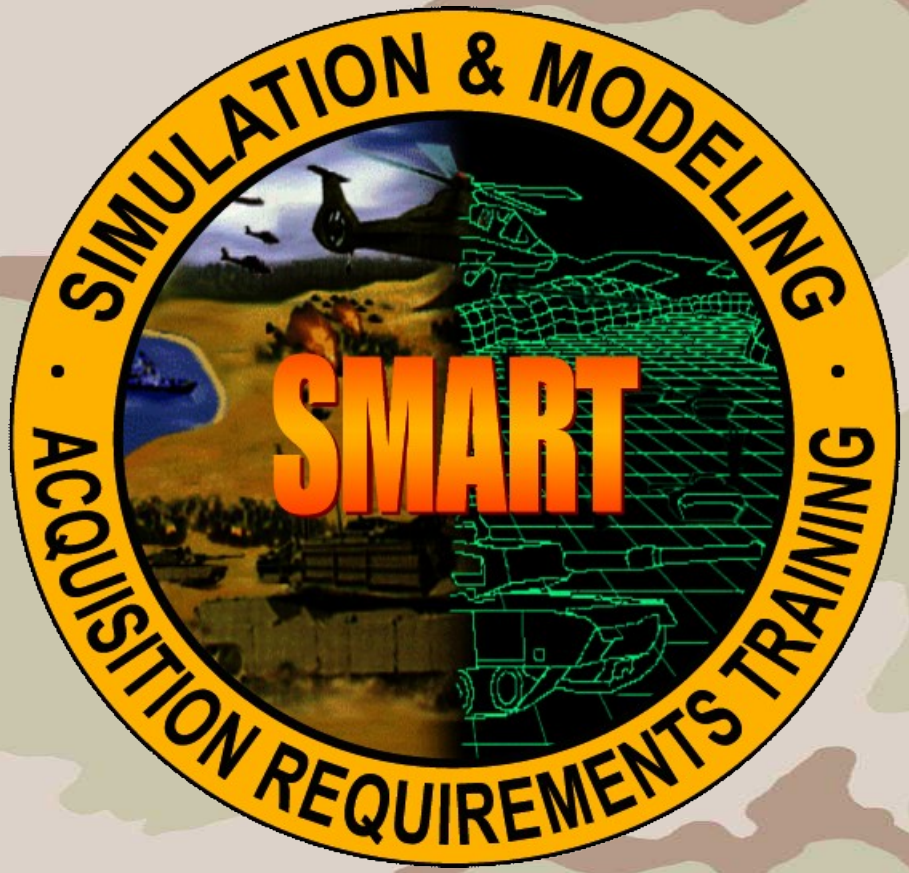
AR 70-1
Army Acquisition Policy.
15 December 1997

DoD Policy

"The PM shall use *SBA and M&S* during system design, system T&E, and system modification and upgrade...PMs shall *integrate SBA/M&S* into program planning activities; shall plan for *life-cycle* application, support, documentation, and reuse of models and simulations; and shall integrate SBA/M&S *across the functional disciplines*."

DoD Regulation 5000.2R Mandatory Procedures for Major Defense Acquisition Programs, 10 June, 2001

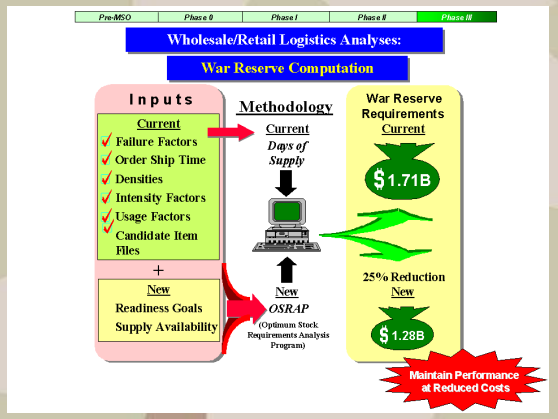
SMART Video


SIMULATION & MODELING
SMART
ACQUISITION REQUIREMENTS TRAINING

Life-Cycle Applications (Training)

JANUS

CCTT



The Optimum Stockage Requirements Analysis Program (OSRAP)

M&S supports systems for training, logistics support, production management, and upgrades and improvements and also can play an

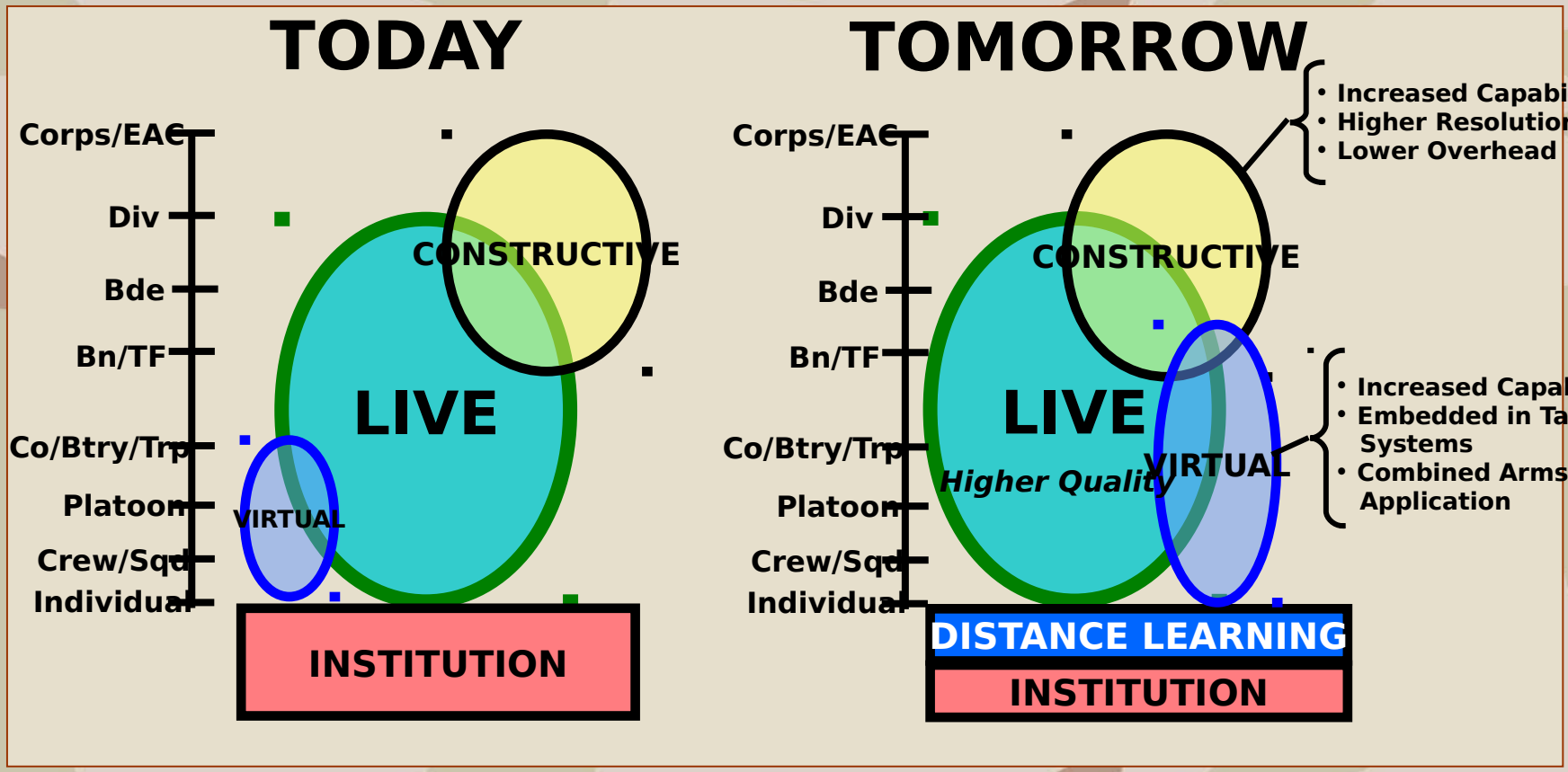
Training Community

Warfighters: Combat, CS, CSS Forces:

- **Collective Training**
- **Staff Training**
- **Crew Training**
- **Individual Training**
- **Mission Rehearsal**
- **Distributed Training**
- **Embedded Training**

FORSCOM, USAREUR, USARPAC, USFK, etc..

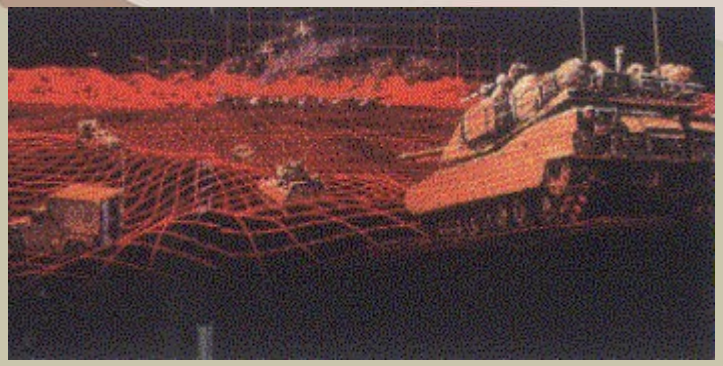
The Army Training Direction



LIVE TRAINING REMAINS THE CORNERSTONE ENHANCED BY VIRTUAL & CONSTRUCTIVE

Life-Cycle Applications (Requirements)

Combined Arms Support Task Force Evaluation Model (CASTFOREM)



Advanced Concept Research Tool

Prior to development, M&S supports mission area analysis, mission needs development, concept and requirement development; later uses support changes in doctrine, product improvements, etc

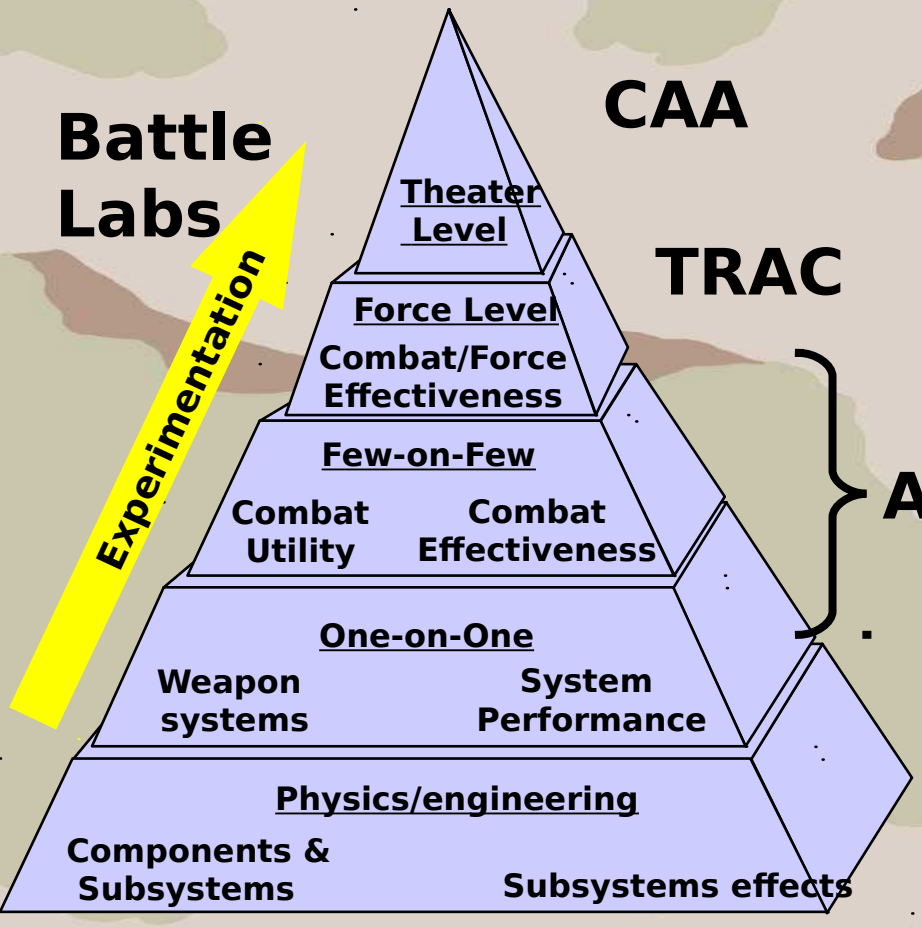
Requirements Community

Doctrine, Analysis & Concepts Forces:

- **Analysis of Alternatives**
- **O&O Development**
- **Requirements**
- **Doctrine Development**
- **Mobilization Analysis & Planning**
- **Strategic Deployment**

- **CAA, TRAC, AMSAA**
- **QDR**
- **Army War Plans**

Army M&S Analytic Hierarchy



CAA

TRAC

AMSAA

RDECs

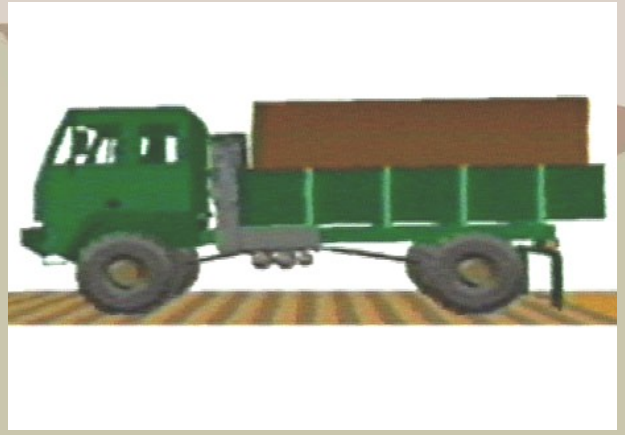
What is the Operational Impact?

How does the system work?

Eliminates unnecessary duplication in M&S requirements from lower levels (S&T and RDEC) to

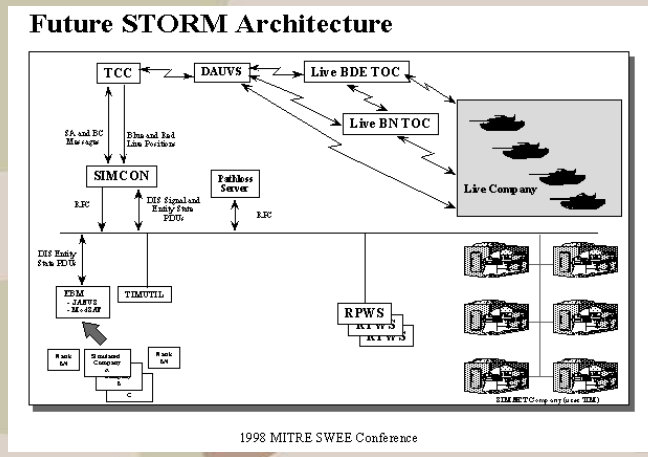
Life-Cycle Applications (Acquisition)

Dynamic Analysis and Design System



Firing Impulse Simulator

Simulation Testing Operations Rehearsal Model (STORM)



During development, M&S supports engineering and design, test and evaluation, and development of training and logistics tactics, techniques, and procedures

Acquisition Community

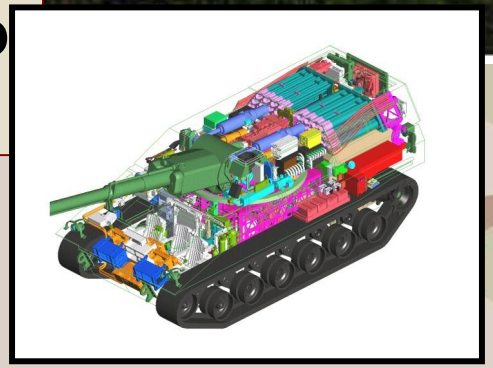
Equipping Forces:

- System Design
- Life Cycle Cost
- Logistics Analysis
- Component Analysis & Design
- Vulnerability Analysis
- Test and Evaluation
- Lethality Analysis
- Performance Factors
- Reliability Analysis
- Manprint

AMC, ATEC, PEOs

Crusader

Design Modeling used to save the program from cancellation

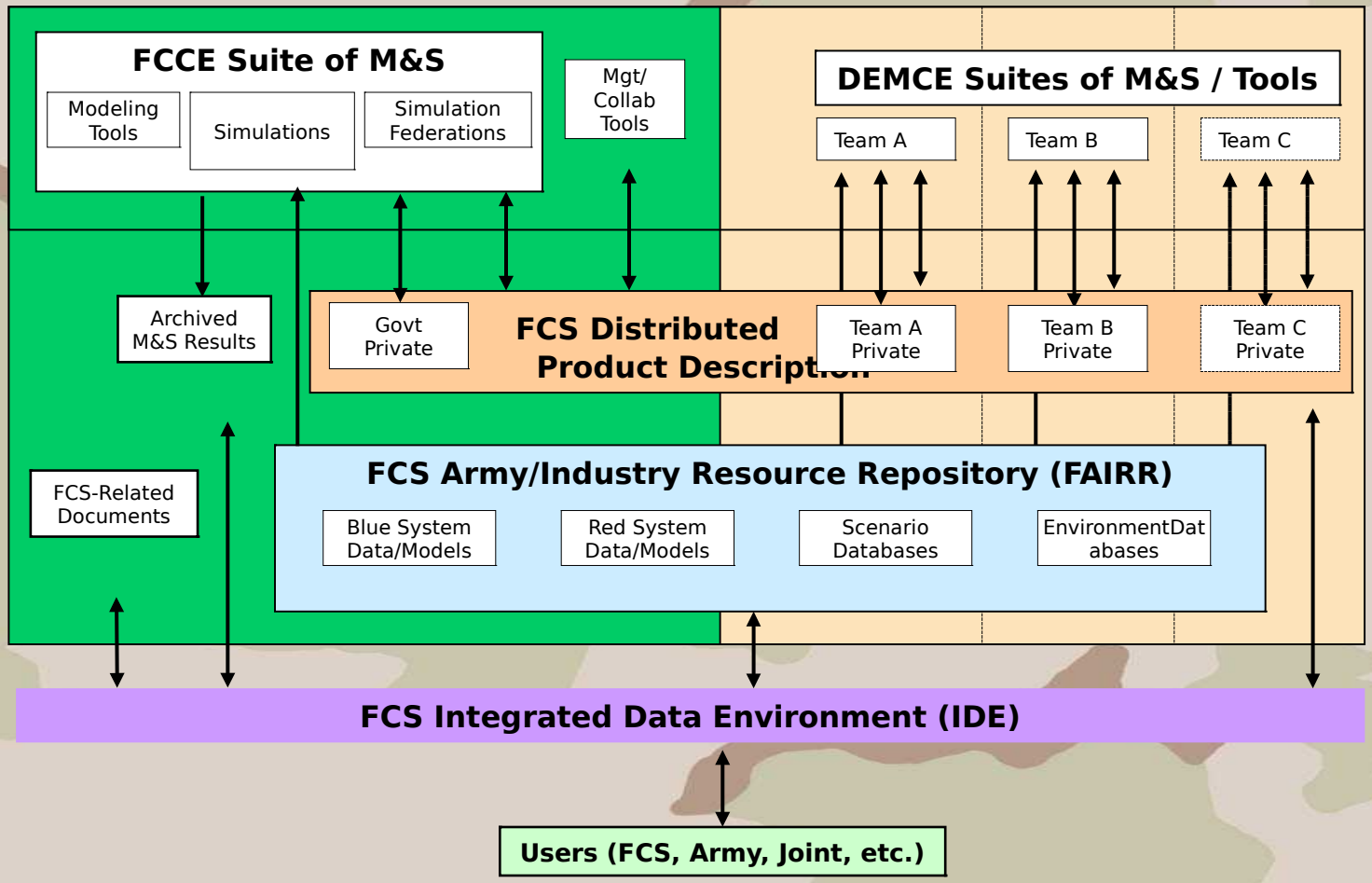


Design Modeling used to build crew trainer

Future Combat System

FCS Future Combat Collaborative Environment (FCCE) Toolset

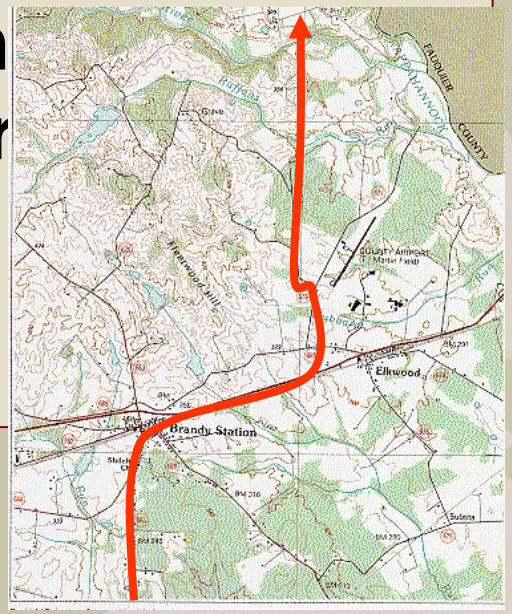
FCS Design, Engineering, Manufacturing Collaborative Environment (DEMCE) Toolset



What is an SSP?

A Simulation Support Plan is a "roadmap" that lays out how M&S tools support overall development of a concept or a system. The SSP depicts the how and when M&S tools are integrated, utilized and tran the course of concept explor and system development.

[SMART Guidelines]



Why the SSP?

The Acquisition Strategy is the "Operations Order" for a system, and the Simulation Support Plan is the "Fire Support Plan"--you may be able to accomplish the mission without fire support, but it's gonna be ugly!

M&S Management

“A simulation support plan will be developed according to SARD Policy memo…” **[AR 5-11]**

“The Simulation Support Plan (SSP), [is] required for all ACAT I, ACAT II and non-major system programs… the M&S support plan will be coordinated with the appropriate support agencies and included in the Program's Acquisition Strategy…” **[SARD Policy memo dated 20 September 1996]**

SSP Required

New Development

Integrated Concept Teams (ICT) are established to develop concepts, and requirements documentation… The ICT produces the initial [simulation support] plan for management of simulations… [TRADOC Pam 71-9]

Advanced Technology Demonstrations

If an ATD includes significant simulations/simulator support…a SSP must be developed… [DA Pam 70-3]

All Systems

The PM articulates his M&S strategy via the Simulation Support Plan (SSP)… [DA Pam 70-3]

Planning Methodology

"...the key to a truly useful SSP is not the format, but a planning methodology that leads to an executable plan." [DA Pam 70-3]

SSP Planning Considerations

- **PURPOSE (WHY)**
  - **How does M&S support lifecycle processes**
- **BACKGROUND**
  - **Requirement Documents, Acquisition Strategy, Doctrine, TTP**
  - **Phases / milestones**
  - **Contractors**
  - **Cost & schedule**
  - **Technology, Policies, etc.**

SSP Planning Considerations

- SCOPE (HOW MUCH)
  - Extent of integration across lifecycle
- OBJECTIVES (WHAT)
  - What will M&S provide--design support, training, logistics
- SCHEDULE (WHEN)
  - Verification Validation & Accreditation
  - Execution
  - Updates

SSP Planning Considerations

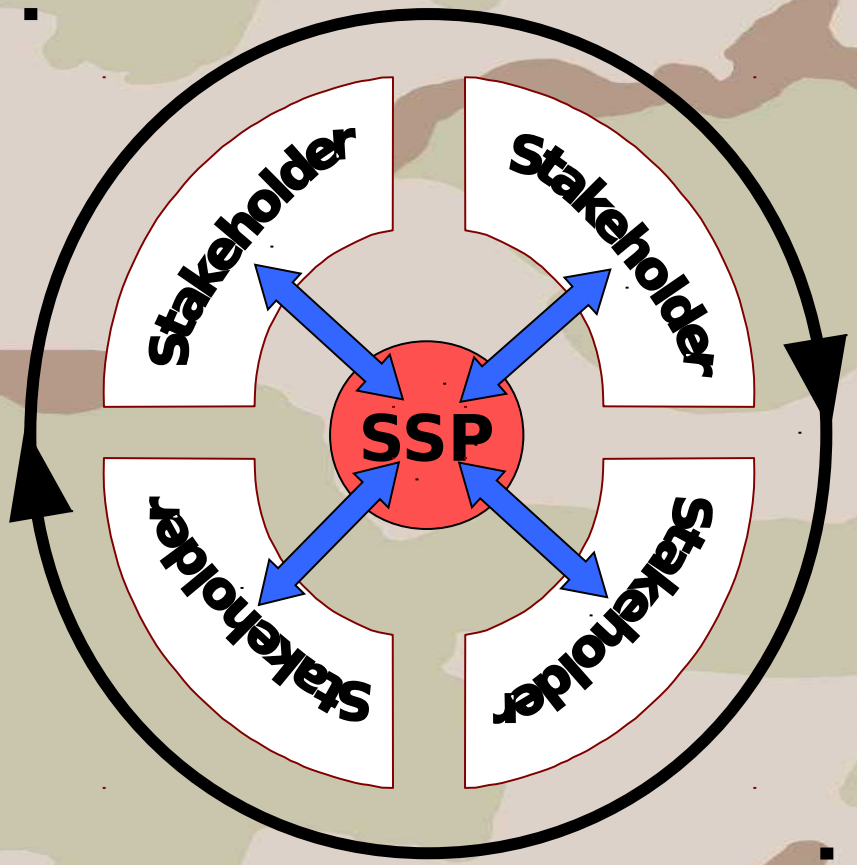
- **SUPPORT STRATEGY**
  - **Concept**
  - **Procedures (HOW)**
  - **Data analysis/decision support**
- **Verification Validation & Accreditation**
  - **V&V Planning & Report**
  - **Accreditation Plan & Report**
- **MANAGEMENT**
  - **Relationships (WHO)**

The SSP Review

- Catch duplication
- Identify investments in this area
- Adherence to best practices
- Identify models used as well as upgrades needed (esp. important if a Enterprise level model such as OneSAF must be upgraded)
- Identify adherence to approved standards (or to help identify places where new standards would be of use)
- Assist with cross domain coordination
- Allow for peer review/incorporation of lessons learned
- Ensure adequate VV&A
- Ensure effective use of Army SME (data/models)
- Ensure S&T (and other efforts) have data/model generation as part of their output

SSP Review Process

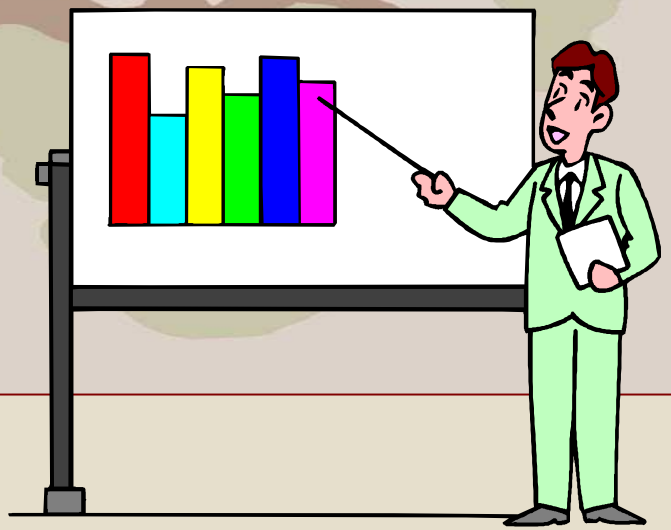
SSP is a living document; should be changed as needed throughout the lifecycle, not just at milestone type events



Initiated by any Stakeholder's identification of need

ADDS VALUE--*NOT* AN APPROVAL PROCESS.

Do I Need an M&S Professional?



Not necessarily!

But you do need someone on the staff that is educated in M&S and can recognize the value and applications of M&S in support of your activities--a resident Subject Matter Expert (SME).

What Can an M&S SME do for the Program?

- **Manage the SSP**
  - **describe the planned implementation of SMART throughout program lifecycle**
    - **development, including during engineering, manufacturing, and design trade studies;**
    - **developmental, operational and live fire testing applications**
    - **in fielding plan, training, logistics support, and preplanned product improvements.**

Adapted from DoD Regulation 5000.2R and SMART Planning Guidelines

What Can an M&S SME do for the Program?

- **Manage investment early and throughout the lifecycle.**
  - **Work closely with the contracting activity to ensure that the government maintains its associated purpose rights when the M&S development is directly related to government funding, or…**
  - **Consider all life-cycle management costs for the duration of the contract, which may include a licensing fee for the software application, operational and/or maintenance costs, and fees for upgrades or changes.**

Adapted from DoD Regulation 5000.2R and SMART Planning Guidelines

What Can an M&S SME do for the Program?

- **Ensure use of Accredited Models and Simulations**
  - **use verified, validated, and accredited models and simulations, and ensure credible applicability for each proposed use.**
- **Ensure all data is examined for use in validation and for reuse in other ways during progression through the lifecycle**
  - **use data from system testing during development to validate the use of M&S.**

Adapted from DoD Regulation 5000.2R and SMART Planning Guidelines

What Can an M&S SME do for the Program?

- Support efficient test planning
  - pre-test results prediction
  - validation of system interoperability
  - to supplement design qualification, actual T&E, manufacturing, and operational support.
  - plan to support both developmental test and operational test objectives.
- Consider Threat implications
  - Closely work with DIA to review and validate threat-related elements in requirements validation and system training

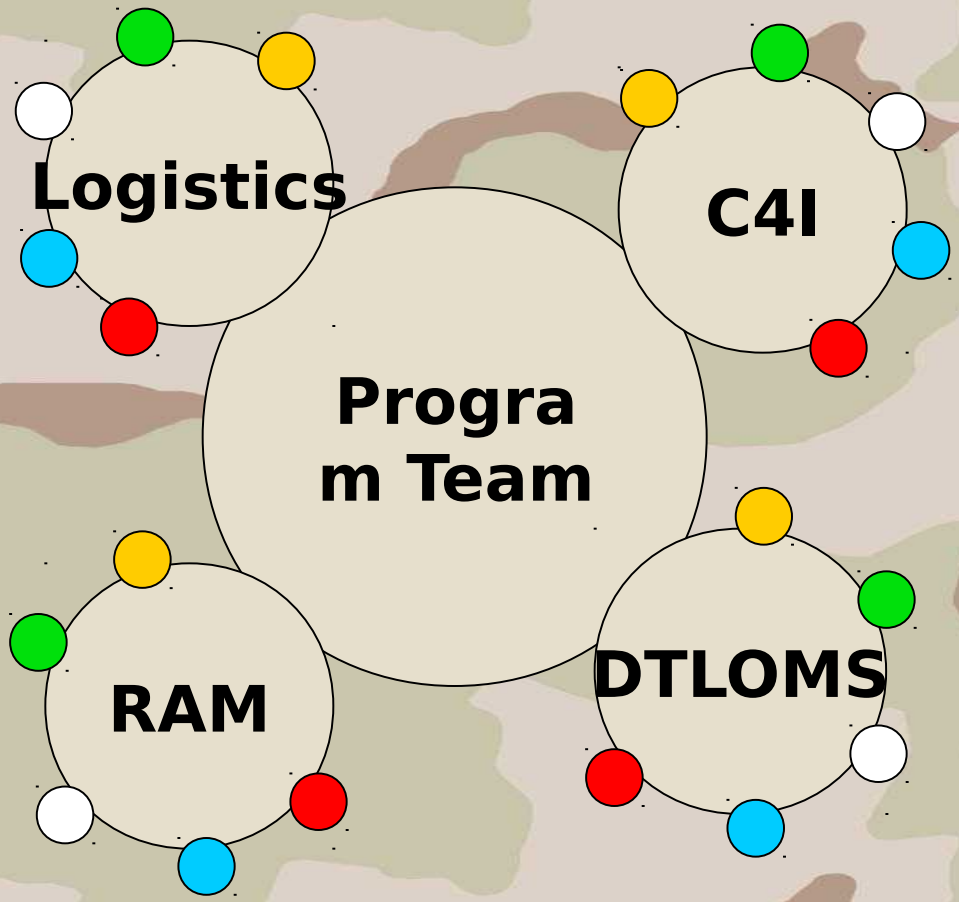
Adapted from DoD Regulation 5000.2R and SMART Planning Guidelines

What Can an M&S SME do for the Program?

- **Consider internal M&S design implications**
  - **High Level Architecture (HLA) compliance**
  - **Synthetic Environment Data Representation and Interchange Specification (SEDRIS) and other data resources and requirements**
  - **Human representation.**
- **External considerations**
  - **Resource Repository listing (Army's MSRR)**
  - **Accessibility to other programs and**

Adapted from DoD Regulation 5000.2R and SMART Planning Guidelines

Organizing the Team



User Developer Program office M&S O/C

Army Model & Simulation Office

Mission Statement

In support of the Army - its mission and soldiers - he Army Model and Simulation Office (AMSO) provide the vision, strategy, oversight, and management Models and Simulations (M&S) across all M&S domai

Core Competencies

- Develop and promulgate the Army's M&S policy;
- Ensures the integration of M&S across Army M&S domains
- Assist senior leaders in properly resourcing Army M&S programs;
- Foster reuse and development of common M&S components and tools
- Act as focal point for Army M&S matters with the Joint Staff, CINCs,
- DARPA, DMSO, Services, DoD Agencies and OSD staff elements;
- Promote the Army's M&S research program
- Serve as Proponent for FA 57.

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- SMART Concept Defined
- Guidelines Responsibility
- SMART Guidelines (Army's SSP)
- SMART Vision & Goals
- Transition of SMART to AMSO
- Example SSPs
  - Crusader
  - FOTT
- SSP Memorandum
- SMART Execution Plan
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- Endorsement for Execution Plan

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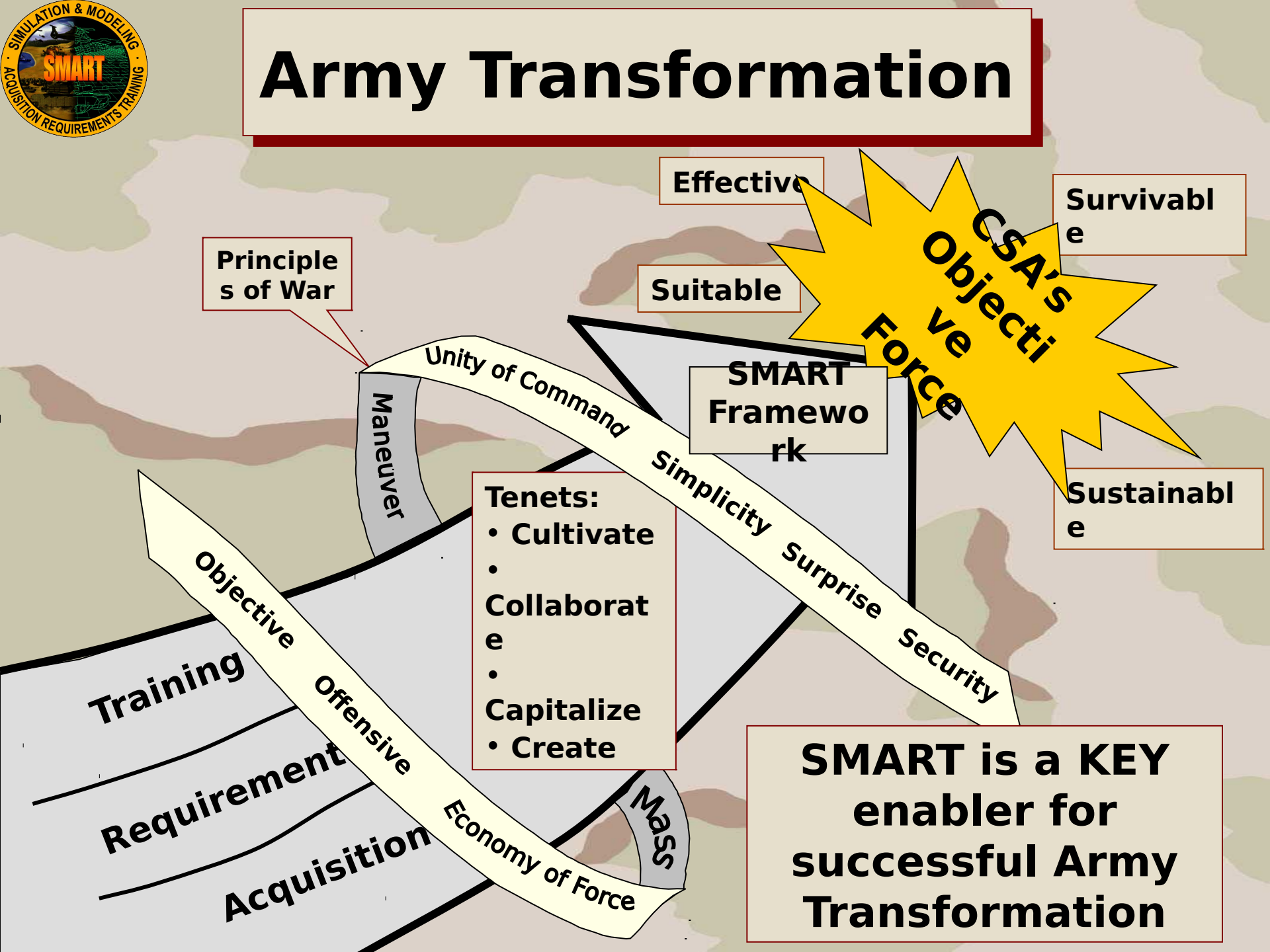
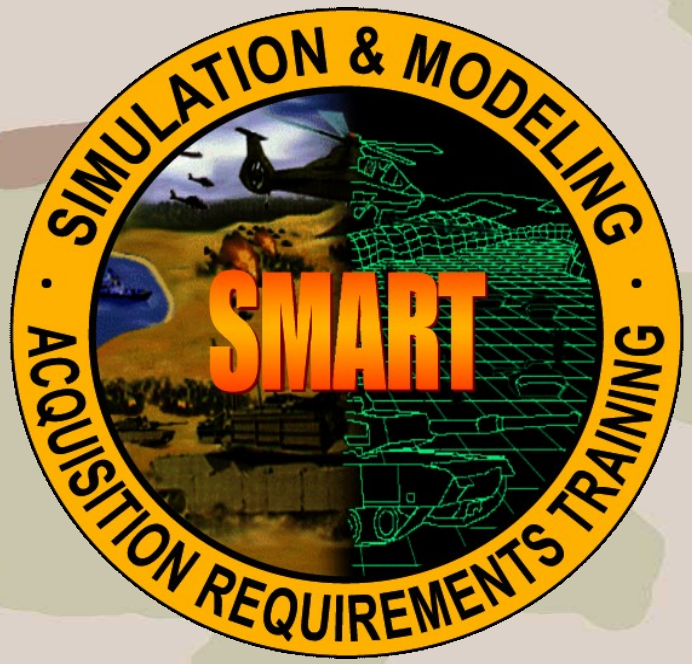


SMART is a KEY enabler for successful Army Transformation

Summary

SMART is a change in Army business practices, that seeks to exploit emerging M&S and other information age technologies, to ensure collaboration and synchronization of effort across the total Army systems life cycle to enable successful Army Transformation.

Questions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